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OXC-1101
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23 November 1960

MEMORANDUM FOR : The Record

SUBJECT : Accelerated Test Program - Engine Support

REFERENCE : a. OXC-0520-60 dated 28 April 1960
"Trip Report-Pratt & Whitney, Florida
R&D Center, 19 through 21 April 1960"

b. OXC-0594-60 dated 29 May 1960
"Trip Report-Pratt & Whitney, Florida
R&D Center, 16 through 18 May 1960"

c. OXC-0675-60 dated 27 June 1960
"Trip Report-Lockheed Aircraft, Burbank
California, 14 through 16 June 1960"

d. OXC-1036 dated 4 November 1960
"Trip Report-Lockheed Aircraft, Burbank
California, 27 and 28 October 1960

25X1A e. [redacted] 4126 to [redacted]

25X1A f. [redacted] 5040 to [redacted] 25X1A

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1. The purpose of this report is to summarize certain aspects of the engine contractor's support capability relative to the subject program. This problem in addition to some others was discussed at a meeting held 16 November in Burbank. Attendees comprised representatives from Lockheed, [redacted], Pratt & Whitney, USAF AF-12 program, together with Col. L. F. Geary, [redacted] 25X1A [redacted], and the writer.

2. The meeting was opened by Lockheed with a definition of the 40 hour/month per article program. It was stated that this target which would accumulate a total of 1450 hours by September 1962 was admittedly ambitious and was offered as a maximum target for discussion purposes. Further, it was admitted that the currently planned level of Lockheed support is geared for a 20 hour/month per article program.

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3. At this point, [redacted] indicated that care must be taken concerning the meaning associated with the 1450 hour total. His opinion, shared by most attendees, was that the completion of 1450 or any other total hour accumulation in itself should not be construed as an operational go ahead. Expansion of this subject will not be undertaken here and mention is made solely in regard to its effect on engine support as summarized in paragraph 5.

4. The engine contractor's presentation made by the P&W West Coast representative was not, in the writer's opinion, fully coordinated with Florida and did not represent a maximum effort.

(a) The initial presentation indicated an overhaul support capability for 10 to 15 hours/month per article for the accelerated test phase. This level of support was considered by all attendees to be incompatible with the over-all program requirements. It was decided, therefore, to plan for a target of 25 hours/month per article.

(b) Upon revision of the engine delivery schedule to agree with that established in ref (e) and upon deferment of article No. 7 downstream of the accelerated test phase, a re-evaluation of the engine support capability was made. This presentation indicated a capability approaching but not equal to the 25 hour/month per article target. The engine contractor then suggested that six engines be added to the program.

5. The above presentations were based upon a time before overhaul (TBO) of 50 hours through October 1962, an engine overhaul turnaround ti e (TAR) of 8 weeks, and an overhaul rate of 2 engs./month. Previously, it had been understood that the TBO would be increased to 100 hours in May 1962 and that the TAR would be 6 weeks as indicated in ref (f). Although it was anticipated that the Florida facility overhaul rate would be insufficient (ref d), the 2 engs./month rate cited seems unduly low.

6. The engine contractor was requested to carefully review the above factors (TBO, TAR, Overhaul Rate) in order to present the best possible effort to meet the 25 hour/month per article target. This, in addition to the 40 hour/month per article target accelerated test and the capability required to support a 15 hour/month per article operation will be discussed in Florida next week.

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7. As implied in paragraph 6, an operational target of 15 hours/month per article was recommended by Col. Geary and [redacted]. This figure will be used by the engine contractor in his planning for maintenance and overhaul. His initial reaction was that additional engines must be added to the program.

8. It has been the writer's opinion that the GNEAPT program must represent a maximum effort by all concerned. It has been understood from the beginning (ref a-c) that the engine to article ratio is marked by austerity and that additional engines might be required as planning targets materialized. The targets for accelerated test and operation cited above may dictate additional engines. Before the "additional engine" concept gains momentum, it seems imperative that the overhaul capability as represented by overhaul rate and TAT be brought into realistic perspective. It behooves the engine contractor to accomplish this together with any initial delivery schedule adjustments required before presenting the alternative of additional engines. Although, it is expected that the Hartford facility will be required, it is hoped that the Florida facility may reflect an overhaul rate greater than 2 engs/month.

9. In anticipation of the engine contractor's said presentation, the writer has been asked to present an opinion of engine support requirements relative to the planning targets cited herein.

It should be noted that an extension of the 85 hour/month per article accelerated test phase beyond September 1962 will require engine support in addition to that estimated in paragraph 9(a) below. This contingency is cited in paragraph 3.

The following paragraphs represent a preliminary and rather "quick and dirty" evaluation of certain alternatives as they exist today. The intent is to show what might be required in order to support these alternatives and not necessarily to express endorsement of one over the others or to indicate that these requirements can be met.

The general bases used are: TBO of 50 hours before November 1962/ 100 hours after November 1962; TAT of 6 weeks; Overhaul Rate as required by engine removal schedule; Article No. 7 replaced downstream by No. 13 assuming first flight on 15 November 1962; other factors are as indicated below.

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(a) 25 hour/month per article accelerated test ending 15 September 1962:

Article no:	1 & 2	@ 15 hrs/month
	3-6,8,9	@ 25 hrs/month
	10	10 hrs accumulated
	11-13	not yet flying
TBO:	50 hrs.	
TAR	6 weeks.	

Overhaul Rate - 8 engs/month maximum
33rd. engine delivery by 15 August 1962
Addition of 2 engines to program in September 1962 is questionable.

(b) 15 hour/month per article "operation" (after 25 hr/month per article accelerated test ending 15 September 1962):

12 articles @ 15 hrs/month
TBO: 100 hrs. starting November 1962
TAR: 6 weeks.
* Overhaul Rate - 12 engs/month maximum to 0 engs/month min.
33rd engine delivered by 15 August 1962.
* Addition of approximately 6-8 engines to program starting in September 1962 @ 2 engs/month.

(c) 40 hour/month per article accelerated test ending 15 September 1962:

Article no:	1 & 2	@ 15 hrs/month
	3-6,8,9	@ 40 hrs/month
	10	10 hours accumulated
	11-13	not yet flying.
TBO:	50 hrs.	
TAR:	6 weeks	

Overhaul Rate - 12 engs/month in October 1962
Delivery schedule increased to 3 engs/month in January 1962.
Addition of approximately 7-8 engines to program continuing at a rate of 3 engs/month with a total of 40 to 41 engines delivered in September 1962.

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(d) 15 hour/month per article "operation" (after 40 hr/month per article accelerated test per paragraph 5(c) ending 15 September 1962):

12 articles @ 15 hrs/month
TBO: 100 hrs. starting November 1962
TBR: 6 weeks
* Overhaul Rate - 12 engs/month maximum at peak load months.
Delivery schedule increased to 3 engs/month in January 1962.
* Addition of approximately 7-8 engines to program continuing at a rate of 3 engs/month with a total of 40 to 41 engines delivered in September 1962.

(e) 40 hour/month per article accelerated test extending beyond September 1962:

Article no: 1 & 2 @ 15 hrs/month
3-6 & 8-13 @ 40 hrs/month
TBO: 50 hrs. prior November 1962/100 hrs. thereafter.
TBR: 6 weeks
Overhaul Rate - 10-12 engs/month continuous
Delivery schedule increased to 3 engs/month in January 1962.
Addition of approximately 11 engines to program continuing at a rate of 3 engs/month with a total of 44 engines delivered in October 1962.

* During the "operational" phase, certain peak load months occur wherein as many as 6 articles/month become due for engine overhaul. This is particularly true in the 15 hour/month "operation" following the 25 hour/month accelerated test (paragraph 9(b)). Here peak overhaul load occurs first in October through December 1962 (reflecting termination of the accelerated phase), followed by no overhaul activity during January through March 1963, then followed by another peak load during early Summer 1963.

In so much as the airframe contractor does not have at this time a flight test schedule breakdown for planning purposes all estimating so far has been based upon an assumed flight test schedule which removes engines for overhaul solely on the basis of TBO. There are many other factors which will affect engine removal for overhaul as well as TBO and these factors may tend to even

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out the peak loads described above. Should these peak loads be tempered, relief from the overhaul rate requirement of 12 engs/month and some reduction in additional engines required may be realized.

10. Based upon the above picture, the following facts become evident:

(a) Overhaul rate must be increased substantially.

(b) TBO should be increased to 100 hours by November 1962, or sooner if possible.

(c) TAR should be held to 6 weeks.

(d) A limited 25 hr/month per article accelerated test should not require more than 2 additional engines if any.

(e) An extended operational level of 15 hrs/month per article for 12 articles may require an addition of 6 to 8 engines to the program.

(f) A limited 40 hr/month per article accelerated test will require an increased engine delivery schedule and the addition of 7 to 8 engines to the program.

(g) An extended 40 hr/month per article accelerated test will require a continuous overhaul rate of 10-12 engines/month, an increased engine delivery schedule, and the addition of about 11 engines to the program.

(h) Moderation of overhaul peak loads (if possible) is desirable and may reduce additional engine requirements.

(i) The termination date of the accelerated test phase will affect the degree of engine support required.

(j) An extended operational level of 15 hrs/month for 12 articles will accumulate 2160 hrs/year. This exceeds the initially targeted level of 1450 hours/year for the 40 hr/month limited accelerated test program described in paragraph 2. This is because in the operational phase all 12 articles are flying whereas in the accelerated program articles reach flight status in progression with the 9th article contributing very little.

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(k) The accelerated test phase by itself is not a realistic base upon which to plan engine support requirements. The subsequent operational level of activity must be considered along with the accelerated test phase because it is during this period that the effect of the combination of extended heavy operation and the activity "buildup" of the accelerated test will be felt.

SIGNED

[redacted]

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